

PATENT COOPERATION TREATY

COPY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
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PCT

WRITTEN OPINION

(PCT Rule 66)

Applicant's or agent's file reference P14248PCT		Date of Mailing (day/month/year) 23 MAY 2005 REPLY DUE within 2 months/days from the above date of mailing
International application No. PCT/US03/15387	International filing date (day/month/year) 15 May 2003 (15.05.2003)	Priority date (day/month/year) 04 June 2002 (04.06.2002)
International Patent Classification (IPC) or both national classification and IPC IPC(7): G02F1/313; G02F1/01 and US Cl.: 385/50,30		
Applicant INTEL CORPORATION		

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2 (a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension. See rule 66.2(d).~~

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis..
For an informal communication with the examiner, see Rule 66.6

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 04 October 2004 (04.10.2004).

Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer <i>Krystyna Suchecki</i> Krystyna Suchecki Telephone No. (571) 272-2495
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I. Basis of the opinion

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
 pages 1-15, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☒ the claims:
 pages 16-22, as originally filed
 pages NONE, as amended (together with any statement) under Article 19
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☒ the drawings:
 pages 1-5, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages NONE, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
 These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE _____
- ☐ the claims, Nos. NONE _____
- ☐ the drawings, sheets/fig NONE _____

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed."

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V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims <u>NONE</u>	YES
	Claims <u>1-9,11-27</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>10, 28</u>	NO
Industrial Applicability (IA)	Claims <u>1-28</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-9 and 11-27 lack novelty under PCT Article 33(2) as being anticipated by Thaniyavarn. Thaniyavarn teaches an apparatus, method and system having first and second single mode asymmetric optical waveguides disposed in a semiconductor substrate layer and having an insulating layer disposed between the waveguides with modulated charge layers proximate to the insulating layer in a coupling region to control an optical coupling strength between the waveguides. A polarized or unpolarized optical beam can be selectively directed evanescently by a capacitive structure and can have amplitude modulation and variable optical attenuation controlled by modulated charge layers or a refractive index change. The insulating layer includes an oxide, namely lithium niobate. Electrodes assist with the creation of the refractive index change and charge layers.

Claim 10 lacks an inventive step under PCT Article 33(3) as being obvious over Thaniyavarn in view of Fukuda. Thaniyavarn does not teach the semiconductor substrate layer including silicon claimed herein. Fukuda teaches that it was known in this art to provide a silicon layer on top of a lithium niobate layer, and under an electrode, in order to provide a buffer layer for the electrode deposition step. Given the similarity of substrate and electrode combination, it would have been obvious to provide a silicon layer as taught by Fukuda between the substrate and electrode for the reasons of providing a buffer layer for a deposition step.

Claim 28 lacks an inventive step under PCT Article 33(3) as being obvious over Thaniyavarn in view of Kapon. Thaniyavarn does not teach the optical system with first and second polarizer claimed herein. Kapon teaches a system with a directional coupler switch wherein polarizers (57, 58) are positioned integrally associated with two separate optical waveguides (Figure 6 and Column 4, lines 27-54). Kapon integrates the polarizers with the waveguides to ensure the essential polarization for effective switching (Column 4, lines 45-51). Given the similarity of the optical switches in the optical systems, it would have been obvious to provide polarizers as taught by Kapon in the system of Thaniyavarn for effective switching.

Claims 1-28 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry. The claimed subject matter can be used in optical switching systems.

NEW CITATIONS

- US 2002/0025103 A1 (Thaniyavarn) 28 February 2002, Paragraphs 48-56.
- US 5,481,636 (Fukuda et al.) 2 January 1996, Column 15, lines 4-8.
- US 4,869,569 (Kapon) 26 September 1989, Figure 6; Column 4, lines 27-54.
- US 4,082,419 (Thompson et al.) 4 April 1978, See entire document.

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.